WHAT IS CLAIMED IS:

1. A method for reducing artifacts in digital data, comprising the steps of:

(a) obtaining a reconstructed block-based pixel representation of the digital data;

(b) extracting a DC coefficient for each block in the pixel representation based on values of selected pixels in that block to generate a map of DC coefficients;

(c) for each pixel block, predicting a select number of lower frequency AC coefficients using the DC coefficient for that pixel block and a select number of neighboring DC coefficients in the DC coefficient map to construct a corresponding partial transform-coefficient block;

(d) classifying each pixel block based on the predicted AC coefficients in the corresponding partial transform-coefficient block; and

(e) selectively performing a low-pass filtering operation on select pixels in select pixel blocks on a block-by-block basis based on the classification of that block, the locations and values of predicted non-zero AC coefficients in the corresponding partial transform block, and certain pixel values in that block.

2. The method of claim 1, wherein, in step (c), the five lowest frequency AC coefficients are predicted for each pixel block.

3. The method of claim 1, wherein the classifying of each pixel block in step (d) comprises comparing the absolute sum of the predicted AC coefficients in the corresponding partial transform block to a threshold.

4. The method of claim 3, wherein, in step (d), a particular pixel block is classified as a low-activity block if the absolute sum of the predicted AC coefficients in the corresponding partial transform-coefficient block is less than the threshold, and, if not, the particular pixel block is classified as a high-activity block.

5. The method of claim 4, wherein step (e) comprises applying a strong low-pass filter to boundary region pixels in select low-activity blocks and applying a weak low-pass filter to pixels in select high-activity blocks.

6. The method of claim 5, wherein, for each low-activity block, the strong low-pass filter is applied to

smooth boundary region pixels in both the horizontal and vertical directions if all of the predicted AC coefficients in the corresponding partial transform-coefficient block have absolute values less than a predetermined value;

smooth boundary region pixels in the vertical direction if at least one AC coefficient in a first select location in the corresponding partial transform-coefficient block has an absolute value greater than or equal to the predetermined value; and

smooth boundary region pixels in the horizontal direction if at least one AC coefficient in a second location in the corresponding partial transform-coefficient block has an absolute value greater than or equal to the predetermined value.

7. The method of claim 6, wherein, for each low-activity block, the strong low-pass filter is applied to a current boundary region pixel only when a difference between a maximum pixel value and a minimum pixel value among a predetermined number of pixels centered on the current boundary region pixel is less than a predetermined parameter.

8. The method of claim 5, wherein, for each high-activity block, the weak low-pass filter is applied to smooth pixels inside the block in the horizontal direction if a difference between values of a first two adjacent pixels and a difference between values of a second two adjacent pixels are both less than a predetermined parameter and is applied to smooth pixels inside the block in the vertical direction if a difference between values of a third two adjacent pixels and a difference between values of a fourth two adjacent pixels are both less than the predetermined parameter.

9. An apparatus for reducing artifacts in digital data, the apparatus comprising:

a DC-coefficient-map generator that receives a reconstructed block-based pixel representation of the digital data and extracts a DC coefficient for each block in the pixel representation based on values of selected pixels in that block to generate a map of DC coefficients;

an AC coefficient predictor that, for each pixel block, predicts a select number of lower frequency AC coefficients using the extracted DC coefficient for that pixel block and a select number of neighboring DC coefficients in the DC coefficient map to construct a corresponding partial transform-coefficient block;

a block classifier that classifies each pixel block based on the predicted AC coefficients in the corresponding partial transform-coefficient block; and

an adaptive filtering unit that selectively performs a low-pass filtering operation on select pixels in select pixel blocks on a block-by-block basis based on the classification of that block, the locations and values of predicted non-zero AC coefficients in the corresponding partial transform block, and certain pixel values in that block.

10. The apparatus of claim 9, wherein the block classifier classifies a particular pixel block as a low-activity block if the absolute sum of the predicted AC coefficients in the corresponding partial transform-coefficient block is less than the threshold, and, if not, classifies the particular pixel block as a high-activity block.

11. The apparatus of claim 10, wherein the adaptive filtering unit comprises a strong low-pass filter that is applied to boundary region pixels in select low-activity blocks, and a weak low-pass filter that is applied to pixels in select high-activity blocks.

12. A machine-readable medium having a program of instructions for directing a machine to perform processing for reducing artifacts in digital data, the program of instructions comprising instructions for:

(a) obtaining a reconstructed block-based pixel representation of the digital data;

(b) extracting a DC coefficient for each block in the pixel representation based on values of selected pixels in that block to generate a map of DC coefficients;

(c) for each pixel block, predicting a select number of lower frequency AC coefficients using the DC coefficient for that pixel block and a select number of neighboring DC coefficients in the DC coefficient map to construct a corresponding partial transform-coefficient block;

(d) classifying each pixel block based on the predicted AC coefficients in the corresponding partial transform-coefficient block; and

(e) selectively performing a low-pass filtering operation on select pixels in select pixel blocks on a block-by-block basis based on the classification of that block, the locations and values of predicted non-zero AC coefficients in the corresponding partial transform block, and certain pixel values in that block.

13. The machine-readable medium of claim 12, wherein, in step (c), the five lowest frequency AC coefficients are predicted for each pixel block.

14. The machine-readable medium of claim 12, wherein the classifying of each pixel block in step (d) comprises comparing the absolute sum of the predicted AC coefficients in the corresponding partial transform block to a threshold.

15. The machine-readable medium of claim 14, wherein, in step (d), a particular pixel block is classified as a low-activity block if the absolute sum of the predicted AC coefficients in the corresponding partial transform-coefficient block is less than the threshold, and, if not, the particular pixel block is classified as a high-activity block.

16. The machine-readable medium of claim 15, wherein step (e) comprises applying a strong low-pass filter to boundary region pixels in select low-activity blocks and applying a weak low-pass filter to pixels in select high-activity blocks.

17. The machine-readable medium of claim 16, wherein, for each low-activity block, the strong low-pass filter is applied to

smooth boundary region pixels in both the horizontal and vertical directions if all of the predicted AC coefficients in the corresponding partial transform-coefficient block have absolute values less than a predetermined value;

smooth boundary region pixels in the vertical direction if at least one AC coefficient in a first select location in the corresponding partial transform-coefficient block has an absolute value greater than or equal to the predetermined value; and

smooth boundary region pixels in the horizontal direction if at least one AC coefficient in a second location in the corresponding partial transform-coefficient block has an absolute value greater than or equal to the predetermined value.

18. The machine-readable medium of claim 17, wherein, for each low-activity block, the strong low-pass filter is applied to a current boundary region pixel only when a difference between a maximum pixel value and a minimum pixel value among a predetermined number of pixels centered on the current boundary region pixel is less than a predetermined parameter.

19. The machine-readable medium of claim 16, wherein, for each high-activity block, the weak low-pass filter is applied to smooth pixels inside the block in the horizontal direction if a difference between values of a first two adjacent pixels and a difference between values of a second two adjacent pixels are both less than a predetermined parameter and is applied to smooth pixels inside the block in the vertical direction if a difference between values of a third two adjacent pixels and a difference between values of a fourth two adjacent pixels are both less than the predetermined parameter.